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Brazil's Arms Industry and Implications for the Future

by

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ABSTRACT

TITLE: Brazil's Arms Industry and Implications for the Future

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PURPOSE: To examine the recent growth in Brazil's arms production and its implications for current and future U.S. policy.

INTENDED READERSHIP: U.S. Arms Control and Disarmament Agency, Defense Security Assistance Agency

BRIEF SUMMARY

Since the mid 1970s Brazil has developed an enormous arms production industry exporting in excess of \$2 billion a year worth of military equipment--most of it to third world countries. This paper examines Brazil's current arms industry and the evolution of this industry since early 1960s as an integral part of the economic development of the country. Additionally, this paper reviews Brazil's arms trade policies and the integration of the government and industries for the economic development of the country.

The paper discusses Brazil's search for technology to include the economic motivation for advance technology. U.S.-Brazilian initiatives for resolving a technology transfer impasse is discussed along with Brazil's efforts to acquire technology by any means at the expense of other considerations.

The paper concludes with the author offering guidelines for U.S.-Brazil technology transfer issues and a broader aspects of future dealings with developing countries linking economic development to emerging democracy.

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EXECUTIVE SUMMARY

Today Brazil is one of the world's largest producers of military hardware and the world's 5th largest exporter. It does better than two billion dollars a year worth of exports which equals about 90% of its annual production. Most of its customers are third world developing countries. The purpose of this paper is to examine the recent growth in Brazil's arms industry and its exportation of defense equipment for political and economic reasons. The purpose of this is to gain some insights from the Brazilian experience that may apply to further relations with developing countries in the area of arms production and technology transfer.

ECONOMIC EFFORTS

With respect to Brazil the paper supports the assumption that Brazil's growth in the military hardware industries was not a result of the necessity to defend the "homeland" but in fact has been a pre-planned integrated economic effort. Brazil's arms industry growth dates back to the early 1960s when several businessmen proposed to the government an arms production plan to include a market feasibility study to determine which third world countries would make good customers for a line of simple, cheap, and reliable weapons systems. All of this was well underway and an integral part of Brazil's economic development of the 1970s when relations between the U.S. and Brazil cooled off as President Carter began to emphasize human rights and nuclear non-proliferation. As the oil shock of the 1970s hit Brazil and other oil-importing developing countries, Brazil increased its efforts toward arms exports to help in offsetting its balance of payments problem.

BRAZIL'S ARMS POLICY

Brazil's policy with respect to exporting military hardware is not documented in hard and fast rules but according to the government its policy is guided by various inputs. These are difficult to state and loose enough to provide all the flexibility needed to allow Brazil to do

what supports its economic interest without being charged with duplicity! In recent years, Brazil has been so flexible in its interpretation to the point of an overriding economic drive at the expense of the political consequences. These include providing arms to both sides in the Iran-Iraq war-against its stated policy-in order to offset its oil expenses. For economic reasons Brazil provided aircraft to the Honduran government after publicly supporting the peace initiative of the Contadora group which forbids providing weapons to the conflict in Central America.

The Brazilian arms industry is totally integrated with the government for the economic advancement of the country and individual corporations. The Brazilian government understands the importance of the entrepreneurs and does everything in its power to guarantee their success in the international arena of arms competition.

SEARCH FOR TECHNOLOGY

There is nothing more ferocious than the competition among entrepreneurs as they vie for the customers for their products. Brazil as a nation (and its arms industries as an integral part of its efforts) is highly motivated to succeed in this competition and thus the need for technology to give them the competitive edge. Among the top motivation is the necessity to keep a positive trade balance to service a \$105 billion national debt. However recent internal events have weakened Brazil's ability to keep its surplus high enough to service its debt, This spells disaster in the long term unless some immediate actions are taken.

Brazil has looked to U.S. companies for the technology it needs to keep its growth going. However because of Brazil's unwillingness to agree not to transfer U.S. technology to third party countries without U.S. approval the U.S. Government has limited technology transfer. This has not stopped Brazil from trying to gain excess to certain technologies and companies are more than willing to assist Brazilian companies because at times it is the only way to gain entry into their markets. This paper discusses current U.S.-Brazilian efforts to work around this stalemate between the governments on the issue of third party transfer of technology.

CONCLUSIONS

The author provides recommendations in dealing with Brazil in technology transfer. The author separates the issue of technology transfer and defines as separate from the issue of protecting strategic technology transfer from the Soviet Union a lower technology tier that should be provided to Brazil. The point is made that if the U.S. does not provide this lower tier technology Brazil will get it from someone else-and it most likely will be U.S. technology passed through one of our "allies." The author suggest an integrated economic/military/political process which allows the businessmen to identify the technology they are willing to export and the military profession the technology they are able to allow to be exported with the knowledge of someday facing it on the battlefield. The statesman then would strive to gain the most mileage possible out of such transfer.

With respect to insights gained from our "Brazilian experience" and future dealings with developing countries the author urges that in the future we not allow the common perception of a parent-child relationship to emerge. Each nation-state has an equal amount of sovereignty and pride and this is not a function of wealth or size. We in the U.S. must learn to develop relationships with other countries-especially developing ones-on a basis of common respect and mutual benefit with a goal of using economic development to spread democracy. Anything short of this will cause the perceptions that prevailed during the early days of U.S.-Brazil relations which caused undue friction.

CHAPTER 1

INTRODUCTION

In the mid 1970s the U.S.-Brazilian security relationship was disrupted over human rights and nuclear proliferation issues. Since then Brazil has developed an arms industry which is competing with the U.S. industries in many areas and is largely outside the influence of the U.S. Government. The purpose of this paper is to examine the recent growth in Brazil's arms industry and its exportation of defense equipment for political and economic reasons. By understanding how U.S. policy and actions influenced, if at all, the Brazilian growth in arms transfer we might gain insight into future relations with other developing countries and policies we should pursue.

This paper concludes that U.S. actions of the mid 1970s had little effect on Brazil's arms industry development. By the mid 1970s Brazil was well on its way to developing an expanding industrial capability and its arms production was an integral part of its growth. Additionally, this paper shows how Brazil has developed its arms industry not as a protector of its homeland but as an economical means of growth and influence in the world. This paper also provides evidence that Brazil is seeking advanced technology at just about any cost in order to continue its growth. The author concludes with the need to learn from the Brazilian experience in dealing with other countries in the future and in developing relationships based on common respect and mutual benefit with a goal of linking economic assistance to the emergence of democracy in developing nations.

The paper begins with a brief overview of Brazil's current arms industry including its three largest companies, the amount of business they do and their customers. Next, the paper discusses the evolution of the U.S.-Brazil relations and the economics of Brazil's arms development. In the fourth chapter Brazil's arms trade policy and linkage between government and industry demonstrates the integrated approach to arms production taken by Brazil. Chapter five highlights Brazil's search for technology and the part the U.S. has played in its efforts. This paper concludes with some recommendations on how to deal with Brazil in technology transfer and the implications for our future dealings with developing countries.

CHAPTER 2

BRAZIL'S ARM INDUSTRY TODAY

Today Brazil is one of the world's largest producers of military hardware and the world's 5th largest exporter. 90% of the military hardware produced in Brazil is exported making Brazil one of the leading competitors in supplying the world's military equipment needs. It is difficult to identify exactly the magnitude of Brazil's defense industry since reliable statistics are hard to come by. There are about 350 enterprises, about half privately owned, employing over 100,000 workers who account for the country's defense production.(1) The value of exports has been estimated in excess of a billion dollars in 1981, and growing to \$3 billion a year in 1985.(2) Regardless of the exactness of the numbers, Brazil is no doubt a formative player in the production and exporting of arms.

BRAZIL'S THREE LARGEST ARM'S PRODUCERS

Most of Brazil's equipment is basically low to medium technology hardware that has a reputation of quality, ruggedness, and flexibility. Three of the largest companies responsible for Brazil's arms production are: Engesa(armored vehicles), Avibras(rockets), and Embraer(aircraft). Engesa is given credit for having started the arms revolution in Brazil when it designed, produced, and marketed the first troop carrier using its "boomerang" rear suspension system. This design allowed for the conversion of a typical truck design into the now well known Urutu and Cascavel vehicles. Now, Engesa employs 10,000 people and is accountable for about half of Brazil's annual multi-billion dollars a year arms export industry.(3) Engesa's vehicles can be found all over the world- wherever a country has a need and money. Since 1980 Engesa's major defense sales have included deliveries to: Cyprus, Iraq, Algeria, Egypt, Morocco, PRC, Thailand, and many Latin American countries with Iraq being the largest customer with over 1500 vehicles sold. Engesa's latest project is the EETI-Osorio main battle tank which they consider to be the latest in the field of tracked combat vehicles. According to Defense Marketing Services(DMS) market intelligence report, Saudi Arabia and Brazil were negotiating in 1985 a \$2 billion arms deal which

included 1000 of these Osorio tanks.(4) No doubt this is competition for U.S., British and West Germany designs.

Embraer-the aircraft company-currently employees about 8000 people and is well known for its range of turboprop aircraft. Its most current turboprop is the EMB-312 TUCANO a basic/advance military trainer using a Pratt&Whitney PT6A-25 engine. The Brazilian Air Force placed an order for 168(118 firm and 50 options) back in 1980 and deliveries started in August 1983. The TUCANO is to replace the T-37Cs at the Brazilian Air Force Academy. Likewise, the TUCANO is being exported with recorded sales in 1984-85 to: UK(130), Egypt(60), Colombia(10+), Honduras(8), and Venezuela(40).(5)

Additionally, Embraer, who brags about 20% of their workforce being in engineering, is responsible for 30% of the development and production of the AMX- a ground attack aircraft being co-produced with Italy for both country's uses in the late 1980s. The memorandum of understanding between Brazil and Italy calls for two Italian contractors, Aeritalia and Aermacchi, to produce 70% of the AMX and Brazil to be responsible for the other 30% to include air intake, wings, wing leading edge slats, tailplane, wing pylons, and fuel tanks. Final assembly of the AMX will take place in both countries with component parts being exchanged. Each country will have a unique configuration of avionics and weapons delivery systems. The initial plans call for a production of 187 aircraft for the Italians and 79 for Brazil with deliveries due to begin in 1987 for Italy and 1988 for Brazil. While export sales have yet to materialize for the AMX, additional production capacity has been planned for the final assembly sites and both countries anticipate that foreign orders will more than double the original production of aircraft. According to DMS market intelligence report, exports will not begin until early 1990s.(6)

Avibras-the missile company-credits itself with 25 years of aerospace tradition in developing and producing artillery rockets systems, fire control units, missiles, and air-to-ground defense systems. The most current system is the ASTROS II rocket system. Among the customers for the ASTROS II are Libya, Iraq, and Saudi Arabia. Avibras is also developing a surface-to-sea shore defense system known as the Barracuda. In the future Avibras has plans to produce Brazil's first medium-range ballistic missile.(7)

CUSTOMERS AND THE FUTURE

As noted above, Brazil's customers can be found all over the world. Its largest customer is Iraq accounting for

over half of Brazil's arms exports. This is not surprising given the conflict between Iraq and Iran and the fact that Iraq is a producer of oil- a product Brazil has been dependent on for years. However, recently Saudi Arabia, Kuwait, and Egypt have joined Iraq as unique customers of Brazil. Saudi Arabia placed a \$300 million order in 1985 for ASTROS II rocket systems while Egypt has purchased and is assembling in Egypt Tucano military trainers for supplying to Iraq. By producing Tucano aircraft in northern Ireland, Britian may be the first in what could be a shift by NATO countries toward reliable Brazilian hardware.

These are just a few of the reportable 40 client nations-most in the third world-who are procuring and using Brazilian technology and weapons. No doubt Brazil's reputation and hardware are spreading around the world and providing competition for developed nation's hardware and influence. Brazil does not have a hard and fast policy on arm's sales but remains fluid with some macro principles guiding them. These will be discussed later. But first, how did Brazil-a country who prior to 1975 did not even export military hardware-get started in the arms business and become the leading exporter to the third world countries?

CHAPTER 3

THE BEGINNING

To answer the question, "How did Brazil get started in the arms export business?", we should first look at historical U.S.-Brazil ties and the subsequent "falling out" between the U.S. and Brazil. It would be very difficult and shallow to suggest that Brazil's sole motivation for its huge developments in the military hardware industry was a result of disagreements with the U.S. over human rights issues and nuclear proliferation, but they do play an interesting part in Brazil's motivations. Additionally, it can be argued that Brazil's motivations were ones of economics—they had the infrastructure for capital investment and were quick to define a market and provide a product that would compete with the developed world's products. Economics of necessity was also a motivation because of their energy dependence and OPEC's "oil shock" of the 1970s. Last, and related to the "oil shock" effect is the growing debt of Brazil and the necessity to come up with the positive trade balance just to pay the annual interest on the \$100 billion plus debt.

TRADITIONAL U.S.-BRAZIL TIES

U.S.- Brazilian relations started in 1823 when the U.S. was the first nation in the world to recognize the newly declared independence of Brazil. There began a relationship that has seen varied interest and involvement between the two nations for many years, but with a common thread of mutual benefit and friendship through the times. In the early 1900s an "unwritten alliance" was developed between the two nations which highlighted the common interest of the hemisphere—as opposed to a previous Brazil-European tie.(8) This relationship continued to develop and was strengthened in 1922 by the establishment of the U.S. naval mission to Brazil. U.S.-Brazil relations were further pulled together when in World War II Brazil provided forces to fight in Italy—the first modern day South American forces to leave the continent to fight! After the war U.S.-Brazil relations got to be a "hot item" with the U.S. as we prepared to line up friends to contain the emerging communist forces in the world. Therefore as we moved into the 1960s and 1970s we

offered and the Brazilians accepted a closer relationship based on the principles that we had the equipment for defense and were willing to share with them on our terms! Our terms and conditions were structured to benefit U.S. national interest while at the same time providing to Brazil that which they were not able to find elsewhere in the free world, at a price that could not be argued with in the form of grants, loans, and sales. As the U.S. developed more sophisticated weapons systems, Brazil began to request these items. This forced the U.S. into a perceived parent-child relationship, with Brazil asking for everything and the U.S. determining(within a U.S. definition) what was "good" for Brazil. This action no doubt began to strain the relationship between the two countries.

THE COOLING OF RELATIONS

As our relationship with Brazil was being strained over the supply of sophisticated hardware, President Carter with his stance on human rights and nuclear proliferation almost scuttled what relationship was left. History shows that by the mid-1970s the government of Brazil had realized that it could no longer continue to suppress the rights of people and expect the world to recognize it as a member of the civilized nations. In fact, by the mid-1970s Brazil had begun to lessen the constraints it felt were necessary for early development and control and began to recognize that to have industrial development the people must be nurtured and cared for. President Carter's attitude toward Brazil was one the U.S. government has had for years, that is we tend to blast our friends on issues while ignoring worst conditions in parts of the world that have no strategic value to us. It was this attitude that upset Brazil the most and along with their national pride made them alter their attitude about our friendship.

On the issue of nuclear energy, Brazil-an energy dependent nation-realized that to reduce the influence of outside forces it needed to develop alternative sources to fossil fuel. However their interest in nuclear energy was seen by President Carter to be an interest in nuclear weapons and therefore he exerted great pressure on those nations providing Brazil this technology to stop. Brazil saw this action as a impingement on its national sovereignty and no doubt this added chillness to our already cooling relations with them. In retrospect, by forcing Brazil to back off of its nuclear energy program the U.S. helped to increase the impact on Brazil's debt when the oil shocks of the 1970s came along. On the other hand, to the best of our knowledge Brazil has not detonated a nuclear device yet.

THE ECONOMICS OF BRAZIL'S ARMS DEVELOPMENT

In 1977 when Brazil terminated any further involvement with the U.S. in military assistance programs it was a conscious decision precipitated by the parent-child attitude and actions of the U.S. But Brazil did not shoot itself in the foot by cutting off a supply of needed equipment. For nearly 15 years prior to this decision Brazil was developing its own industrialized capability-with military hardware plans as an integral part of its development-and therefore carefully understood the consequences of breaking with the U.S., but believed it could survive. In fact it would not take much imagination to see that the Brazilian government took advantage of a political situation(decaying US-Brazil relations) to rally its populace behind an economic decision(expansion of its arms industry).

In a recent article, Carol Evans discusses how the efforts of the Brazilian government in the area of military hardware production date back to the early 1960s when "Brazilian industries apparently coordinated an arms production plan 1964-66 and proposed the project to Brazil's military establishment." (9) She goes on to further identify a "market feasibility study" that was conducted among selected third-world countries to identify where a market for "simple, cheap, and reliable weapons systems" could be found. (10)

These actions appear to help define the beginning of an industry that was evolving along the lines of Brazil's efforts to become less dependent on imports and to provide an economy of exports which would support a national priority of total economic development. The arms industry got caught up in the economic miracle of the late 1960s-early 1970s when the annual growth rate of Brazil's economy was nearly 10%. The arms development followed the same lines as other economic development. The government participated with industry in providing the capital for growth while encouraging multinational corporations(through economic incentives) to invest in Brazil's developing industry by bring technology into the country. Therefore in 1977 when Brazil terminated arms agreements with the U.S. it was a timely pullout backed by the belief that its industry was developed enough to go it on its own and in fact to compete with the U.S. in the area of supplying arms to third-world countries.

THE OIL SHOCK AND THE DEBT ISSUE

The oil shock of the 1970s and the increasing debt of Brazil brought on by the world recession and high interest rates of the early 1980s has made for a crisis in the country's economics stability. Brazil's expansion in the 1970s was supported by the availability of cheap imported oil. When the price of oil jumped in the early 1970s Brazil managed to keep the growth going for 1974-80 (at a rate of 5% vs the 10% of the miracle age), but at the expense of borrowing capital. The subsequent interest rate rise and continued high price of oil while trying to continue the economic development and appease consumers at home brought about the increased debt for Brazil. During this crisis development, Brazil pushed exports harder than ever and the arms industry did its part.

Brazil established a policy of buying oil from those countries purchasing its exports. In the area of hardware, Iraq-Brazil's largest principal oil supplier-has been its number one customer for years. Likewise most recently Brazil has been expanding its market to capture the attention of several other oil producing nations. Most notable is Saudi Arabia-Brazil negotiations for the purchase of 1000 Osorio tanks.(11) Brazil's export of large amounts of arms helps keep the Brazilian trade balance above \$10+ billion a year.

CHAPTER 4

BRAZIL'S ARMS TRADE

In the previous section I discussed the evolution of Brazil's arms industry and the enormous growth that has taken place over the last ten years. The purpose of this growth has not been for either the internal or external protection of the Brazilian homeland but--without any doubt--this growth and subsequent exporting of these arms has been for the economic benefits and hard currency it brings to Brazil. In this section I will discuss the policies that Brazil follows--or does not follow at times, for the integration of government and industry for the protection of the country's interest and furthering of economic gains. Finally some implications that Brazil's attitudes and behavior have on the rest of the world will be discussed.

ARM'S POLICY

"Brazil abides by the principle that the sale of defense material is not a part or an instrument of Brazilian foreign policy." (12) So states the introduction to the 1986 edition of the catalogue of Brazil Defense Equipment. The introduction goes on to explain that Brazil unlike some other countries--the U.S. implied--does not attach conditions to the sale or resale of its equipment and therefore can be counted on to be a reliable supplier of arms. However in practice, Brazil does use the sales of defense material to support its foreign interest--limited as they may be. As such, Brazil does not have a stated policy on arms trade but instead is guided by various government ministries, the Armed Forces, and the producing industries themselves. The guidance is general in nature--therefore allowing for necessary interpretation--and basically supports diplomatic and political considerations loosely defined as:

Arms sales negotiations are conducted on a government-to-government basis.

Arms sales to guerrilla or subversive groups are not considered.

Arms sales to unstable governments or those with unsavory reputations are generally avoided

Sales to countries on the brink of war-where the export of Brazilian arms could influence the commencement of hostilities-are avoided

Arms are not sold to both sides in a conflict(13)

Supposedly the Brazilian National Security Council(CSN) controls the process and approval of exports. Usually a request from a country for arms is directed at the particular company who produces the item and they in turn apply for the export license. Before approving the request the CSN coordinates with interested parts of the government and the Ministry of Foreign Affairs determines that the sale is in the best interest of Brazil.(14)

CONTRADICTIONS

Several events and arms agreement/sales in recent years highlight the "flexibility" of the above guidance-almost to the point that one can see the overriding drive for the economic benefit at the expense of the political consequences. In an August 1984 article, John Hoyt Williams noted that both sides of the Persian Gulf war were using Brazilian weapons. Mr. Williams describes the magnitude of the sales to Iraq-Brazil's number one customer-and identified Libya as another major Brazilian customer who is "a known conduit of these(weapons) to Iran." According to the article, Libya bought in 1982 a hundred Tucano trainers-known for their offensive capability-which is far to many for the sole use of its small air force.(15)

In a March 1986 article Richard W. Foster noted that the Brazilian Foreign Ministry, "has been more than willing in the past to put trade before diplomatic concerns."(16) Mr Foster goes on to explain the embarrassment that befell the Brazilian government in 1985 when after publicly supporting the peace-mankind initiative of the Contadora group in Central America they sold Tucanos(eight of them) to the Honduran government. Brazil identified the aircraft as trainers, but all the world knows the Tucano has the capability to deliver weapons and the role Honduras is playing in the Central American conflict.

In early 1986 Jose Luis Whitaker Ribeiro, managing director of Engesa-Brazil's largest arms company, denounced the U.S.-led trade embargo against Libya and said he intends

to continue supplying Libya, his friends, and said the U.S. sells to its friends, why not Brazil to its friends? And, according to Whitaker, if we don't sell to Libya someone else will' (17)

The above examples, while not at all exhaustive of the perceived contradiction between a stated Brazilian policy--although a malleable one-- and the actions of the country, indicate Brazil's desire to put economic considerations before political considerations when it is in its interest.

GOVERNMENT-INDUSTRY INTERFACE

The arms industry of Brazil is totally in step with the government for the economic advancement of the country and the individual corporations. The Brazilian government understands the importance of the entrepreneurs and does everything in its power to guarantee their success in the international arena of arms competition. The state-owned holding company IMBEL was established for the purpose of integrating the private sector with the government to provide maximum advantage to Brazilian companies in the international environment and to encourage domestic development. According to John Hoyt Williams, IMBEL has two principal international functions:

It seeks out Western armaments firms that produce hardware it considers suitable for Brazilian export and entices them to build factories in Brazil or to license the production of their hardware in that country.

... soliciting and negotiating foreign arms sales. (18)

In the course of enticing companies to participate in Brazil's industrial development the country offers through its banks financing at attractive interest rates. Additionally, the government assists corporations by helping through government-to-government contracts and credits. (19)

Another assist provided to Brazilian companies is the government's support in keeping out competition to fledgling enterprises. This is done by several means to include laws to block import of technology that would hamper internal development, and a quagmire of regulations and procedures for companies trying to license technology that is not crucial to Brazil's industrial development.

IMPLICATIONS

The implications of Brazilian arms trade to the world order are far-reaching and not easily definable. From an East-West perspective the influence of Brazil's arms (among the third-world) may cause a decline in Soviet competitiveness according to an article by William H. Lewis in the 1985 edition of the U.S. Arms Control and Disarmament Agency's World Military Expenditures and Arms Transfers. Lewis describes how Brazil, along with other emerging nations, has obtained technology from the developed countries and is now competing in the world market with equipment that is less costly and more reliable than the Soviet vintage. By loosing a share of the market to Brazil and the likes the Soviets are in a press in obtaining hard currency. (20) I would add that while the U.S. may be losing influence among the arms customers of the world, losing out to Brazil is far better than losing out to an increasing Soviet influence. Therefore while we might be losing we are not in a zero-sum situation with the Soviets over these developing areas of the world. Maybe not a good situation to be in-but no doubt not the worst of all!

Probably the strongest implication to Brazil's arms trade activities is the impact on regional conflicts and balance. As noted above Brazil has been providing hardware to both sides of the Persian Gulf war. Their interests have been economic and their attitude one of- if Brazil does not sell to those nations someone else will, so why not let Brazil make the profit! With many other nations of the world-the U.S. included-providing arms to one or both sides of the Iran-Iraq conflict it is hard to isolate how much-if any-Brazil is tinkering with the balance in the area.

From a western prospective, Brazil is a strong anti-communist nation which shares common values and culture with our society. Even through it is out to make a profit there is nothing to indicate that it has supported the overthrow of elected governments. Therefore, while we may not agree 100% with what or how it execute its arms trading the U.S. really has no argument to pick with Brazil that should cause us to come to a split of the magnitude of the mid-1970s. However there are U.S. concerns with Brazil and technology transfer issues that put the U.S. and Brazil at odds. The next section will address Brazil's search for technology and U.S. concerns.

CHAPTER 5

BFAZIL'S SEARCH FOR TECHNOLOGY

Earlier in the paper I discussed the "cause and effects" of the evolution of Brazil's arms industry. As stated, Brazil and its industries have evolved into a formative institution to be dealt with in the international arena-especially in terms of arms production and exporting. Now that Brazil is on a "roll" it has realized-more important than ever before-the need for technology to keep the industry growing. The purpose of this section is to discuss that need and motivation, and the U.S. involvement in assisting Brazil to satisfy its need-to include U.S. requirements and U.S./Brazil initiatives that are being taken. Additionally I will discuss some actions taken by Brazil's industry that has caused some U.S. concerns, and then close with dilemmas we and Brazil face.

THE NEED AND MOTIVATION FOR TECHNOLOGY

As discussed earlier and believed by just about everyone in both the U.S. and Brazilian governments, Brazil does not have a security need that would justify the magnitude of arms industry development that has been seen. I have suggested-and many agree-that Brazil's involvement in the arms industry is one of economics. And that is where the need for more technology resides! There is nothing more ferocious than the competition among entrepreneurs as they vie for customers for their products. Brazil as a nation (and its arms industries as an integral part of its efforts) is highly motivated to succeed in this competition and thus the need for technology to give it the competitive edge.

Among the top of these motivations has to be the need for a positive trade balance that results when more products are exported than imported. Brazil is sitting on top of a \$105 billion national debt that requires at least \$7 billion a year just to service. Most-if not all-of this is owed to the U.S. and its banks. Therefore Brazil needs U.S. dollars and those can only be obtained by trade. Up until recently Brazil's trade surplus was running at \$10+ billion a year-just enough to break even on its debt servicing.

However conditions of an over-valued currency and an increase in domestic demands for imports caused by a freeze in prices but not wages has caused Brazil's trade balance to begin declining. In late 1986 its monthly trade balance declined from a rate of \$1.1 billion to \$200 million. This means in the future Brazil's trade balance of \$10+ billion a year will go to about \$2 billion a year.(21) To help bolster its exports Brazil has to-among other actions-become more competitive with its products abroad and therefore needs advanced technology.

Another Brazilian motivation is its desire to become more of an influence in the South Atlantic region-especially the east coast of Africa. With the recent emergence of its civilian controlled government, Brazil is ready to come out of its shell and enter the league of international politics played by the developed nations. Such action has started with the Brazilian proposal to the United Nations General Assembly for the "South Atlantic Zone of Peace."(22) What this will exactly entail is yet to be seen but no doubt Brazil will use the concept to impress upon its neighbors and the countries of Africa-that can afford its products-that Brazil is a prominent country of influence in the Atlantic. With an eye toward international markets and economic benefits to itself, Brazil will no doubt take advantage of trade opportunities with new nations. To convince these customers it is in fact the prominent country of the area, Brazil will need to demonstrate advanced technological capabilities-like the developed countries. This technology would not be exported to these lesser developed nations as they could not afford the high technology nor are they ready for it. Brazil would use its newly acquired technology to impress these countries-the same as the U.S. has done for years with third world countries-while selling them the lesser technology products they can afford and use.

REQUIREMENTS FOR U.S. TECHNOLOGY TRANSFER

U.S. policy for the transfer of military technology to other nations is based on a gamut of public laws and regulations to include the Arms Export Control Act, Foreign Assistance Acts, Export Administration Act, and the International Traffic in Arms Regulations(ITAR). Transfer of U.S. origin technology is basically controlled by three executive agencies-the Departments of State, Defense, and Commerce. Requests that fall under the purview of "munitions" must be acted on by the U.S. State Department after consultation with the Department of Defense. Requests for classified data are judged against OSD's National Disclosure Policy guidance to determine if it is in U.S.

national interest to share a specific technology or capability. Dual use technology transfer--that which has both a commercial and military use--is the responsibility of the Commerce Department. Of course none of these departments act alone but in fact there is a network of contacts among all agencies concerned with technology transfer that allows for exchange of data and coordination of U.S. releases.

In all military technology provided to a country the U.S. has a stipulation, based in public law, that release to any third country (except for our closet allies) of this technology or products of our technology is prohibited without U.S. prior approval. The purpose of this stipulation is to protect our technology and to allow the U.S. to use our technology as a tool of foreign policy and influence. Therefore before we conclude a government-to-government agreement with a country we execute what is called a General Security of Military Information Agreement (GSOMIA) which stipulates this control. Likewise, the ITAR cited above provides for the specific wording to be used in commercial contracts that also requires U.S. government approval of re-release of technology to third party countries.

The enforcement responsibility of these technology transfer stipulations is at best fragmented among U.S. agencies and at times with reference to Brazil has not been closely monitored nor seen to be a matter of great concern to U.S. government agencies.

U.S.-BRAZIL INITIATIVES

In 1982 President Reagan visited Brazil in an effort to repair some of the damage suffered in our relationship during President Carter's days. Upon his return, President Reagan directed U.S. agencies under the leadership of the State Department to work with Brazilian officials to develop concepts of cooperation. U.S. and Brazilian officials meet during 1983/84 and through five working groups "considered the possibilities for enhanced cooperation between our two countries in the field of economic, military/industrial, nuclear energy, science and technology and space activities." (23)

The Industrial/Military working group had a difficult task to deal with. The U.S. acknowledged the Brazilian economic development policy and the government's integration of its military-arms industry with its economic goal of effective technology transfer. The tough part came with the "how" of this with respect to U.S. technology and the fact that the Government of Brazil (GOB) has refused to sign a GSOMIA restricting transfer of U.S. technology to third

party countries. As a compromise the Memorandum of Understanding (MOU) stipulated the type of transfer controls the U.S. wanted on classified data while agreeing to continue to work on an overall agreement--i.e. GSOMIA. (24) Likewise the MOU laid the responsibility on the respective governments to insure that their respective industries followed the provisions outlined for the protection and transfer of classified data. No doubt this was a good move on the part of the U.S. in light of the Brazilian government's lack of control over its industry in other third party transfers of technology.

BRAZILIAN INDUSTRIAL ACTIVITIES

Brazil and its arms industries are always after technology that can improve their capability and competitive advantage. At times their drive to obtain this technology is at the expense of everything else including agreements made with U.S. companies and in violation of technology transfer agreements. Such was the story behind a deal between a U.S. contractor, Sikorsky Aircraft Company--a division of United Technology--and Embraer, the Brazilian aircraft company. As Sikorsky was negotiating with Embraer for offset commitments in advance of a proposed sale of helicopters to the GOB, Sikorsky agreed to provide various types of composite technology to Embraer. Sikorsky had gone through the U.S. licensing process with this proposed transfer and the U.S. Department of State had stipulated a commercial use only restraint on the composite technology to be transferred. The technology and the technical assistance Sikorsky provided--all in advance of a contract being awarded--provided Embraer the knowledge to develop an organic composite capability to include quality control, parts design, and techniques using honeycomb sandwich structure. Additionally this assistance provided Embraer with the technical knowledge to modify the processes to allow applications to other products. Sikorsky did not win the award of the GOB helicopter contract! Embraer did offer Sikorsky \$5 million of offset credits--what Embraer considered to be the value of the technology. (25) It should not surprise us if Embraer has turned around and applied the composite technology to the manufacturing of the Tucano and Brasilia aircraft both of which have military applications and have been exported all over the world. It would be in its nature to do this without the U.S. knowledge and consent, as required in the technology transfer agreements with Embraer!

Sikorsky is not the only U.S. company that has come up on the short end when dealing with Brazilian industries. Several other U.S. defense contractors are suffering from improper technical data transfer and reverse engineering

that ultimately blocked them and their products out of the Brazilian market.(24)

DILEMMAS

Brazilian law requires that all technology transfer agreements that its industries enter into with companies of other nations not contain stipulations preventing the transfer to third country/customer of that technology or subsequent products derived from that technology. The Brazilian requirement is in direct contrast to our policy of technology transfer requirements. The Brazilian government states that any constraint by another nation on who they can sell to is an infringement on their sovereignty. This makes for good rhetoric but when one agrees that Brazil's arms industry is economically driven then it is easy to believe that Brazil's real motivation is to protect its markets and business deals. None the less, there is a real deadlock between the U.S. and Brazil on U.S. technology transfer. The GOB continues to refuse to sign the GSOMIA-to the point that some believe the issue is dead! At the same time the GOB turns it back when its industry people sign U.S. commercial contracts that contain the U.S. International Traffic in Arms Regulations requirement of no third country transfer of U.S. technology without U.S. approval. And as discussed above the GOB does not control the subsequent transfer of this technology or products to third party customers. This dilemma is straining the U.S. officials who are trying to work with Brazil within the U.S. laws. The GOB is not making matters any better with its refusal to police its industry or to acknowledge our concerns.

As if this were not enough of a dilemma, the trade dilemma between the U.S. and Brazil overshadows technology transfer issues and may be the reason the U.S. is not preoccupied with the technology transfer issue. In the area of trade, Brazil has closed its markets to certain items to encourage domestic development of particular industries. The big issue on our national agenda with Brazil is its Informatics Law and subsequent restriction of the importing of U.S. electronics and digital instrumentation into Brazil so that its industry can develop without foreign domination. The U.S. has filed a section 301 case under the Trade Act. The U.S. and Brazil have until the end of 1986 to resolve this impasse or the U.S. will retaliate against Brazilian steel, shoes, and aircraft exports to U.S. markets to recoup what is considered damages to our industry for being blocked out of the Brazilian informatics market.(27)

The real dilemma comes when we look at the issue of trade and debt. The only way Brazil can afford to get

dollars to service its debt and avoid total financial collapse is to increase its industrial capability and exports-especially to the U.S. On the other hand, we have an issue with their trade protection policies and are on the verge of taking retaliatory actions to lessen their trade with us! There is no easy solution on this one. The answers are not going to come easy, but in the next section I offer some concluding observations and implications to future relations with developing countries and U.S. technology support.

CHAPTER 6

CONCLUSIONS AND IMPLICATIONS FOR THE FUTURE

The purpose of this paper has not been to present a diatribe of Brazil's arms industry evolution and subsequent elevation among the arms producers of the world. My purpose has been to offer a paradigm of a developing country's evolution into the economics of a growing world commodity-weapons of war. There is nothing that will guarantee that the next country to discover the benefits of the "economics of weapons of war" will behave the same as Brazil, but maybe from an understanding of Brazil's evolution process and actions we in the U.S. may be in a better position to avoid the mistakes of the 1970s and next time nurture a relationship that is beneficial to both the U.S. and client country.

HOW TO DEAL WITH BRAZIL IN TECHNOLOGY TRANSFER

The first point to make in the issue of technology transfer and Brazil is that our level of involvement with Brazil is on a lower technology tier than the strategic technology transfer issues we have with the Soviet Union. This is because Brazil has found a market for the less sophisticated weapons required by countries with a minimum educated and trained armed forces. Brazil's customers require cheap, reliable weapons and that is what Brazil produces. If Brazil were to push itself into an upper tier of weapons technology, it would find the number of customers very limited and most likely among the developed world-who don't need Brazil's help.

The second point is that of the availability of the technology Brazil needs to keep its industry growing. And the bottom line is that if we don't provide its needed technology, Brazil will find someone else to provide it! It might have to pay more or it might not be up to American standards, but from a pure economic view if Brazil has the need someone will fill it. My point here is that we should be the ones to answer Brazil's needs but we should follow some guidelines in doing this. These guidelines must be within U.S. laws and should fulfill a strategy that is balanced among our military, economic, and political considerations.

The Law Issue

As noted previously, our relationship with Brazil and technology transfer dabbles on the edge of the legality of our actions. We should not as a nation force ourselves to operate there. This is bad for our credibility with other nations on this and other issues and could set a precedent that those who follow us should not have to deal with. We should either change the law or enforce the law as it exist! I would propose that we seek to change the third country export laws as they apply to Brazil and other developing countries after our lower tier technology and judge the release of technology in light of military/economic/political considerations.

Economic Considerations.

We should let American businesses decided what technology they want exported because they are the ones who are going to have to compete with the products that result from transfers. The U.S. Government does not own any of our defense industries, and is not responsible for their profit or loss. So therefore from a business perspective the U.S. Government should not be dictating to U.S. businesses how to make a business decision. If a company believes that it can do better selling a technology now rather than later, or that it has the next generation and is ready to let the first out of their control, then let's let them do it-within the military considerations.

Military Considerations

This should be the determination of the military profession as to whether or not we would want to face and fight on the battlefield someday the technology that we would be willing to transfer. Of concern is the availability to the American soldier of the counter to this released technology. Also we should be concerned if a released technology would allow the development of effective counter to our current capabilities. We should protect our capabilities, but at the same time do a realistic assessment of technology transfer impacts and development of improved capabilities for U.S. forces.

Political Concerns.

Once the businessman and the professional soldier have decided that the release of a technology is in our best interest the statesman should strive to get the most mileage possible out of such a transfer. World politics operates on "quid pro quo" and countries that want to take advantage of our advanced technology are going to have to learn that there are no "free lunches", and one must pay for what one gets!

In dealing with Brazil we should follow the above approach and strive to strengthen our relationship with Brazil but make it understand that we must do it within our laws and only to the point that our national interest is served as well as theirs.

IMPLICATIONS FOR THE FUTURE

In dealing with developing countries on the issue of technology transfer we should learn from the experiences of Brazil and work to develop these countries' economic capabilities to allow them to approach the standard of living of the developed countries. Brazil has shown us the emergence of a country that was suppressed and downtrodden only a few years ago. No doubt the force behind this emergence was industrial development--and that can't happen without technology transfer.

We can not prevent technological advances! Nations that are following in Brazil's footsteps are going to do just as Brazil did--that is, they are going to get access to the technology they need to develop their country and industries. The only variables are time and the source of these technologies. The U.S. should become an integral part of these countries' industrial development for obvious reasons. We can do this while at the same time protecting the technological aspects of our national interest if we develop a strategy of military/economic/political implementation of this low level technology these developing countries require to get them on the road to full development.

What effect should the Brazilian lesson have on our own sales policy and production? Have we learned anything that can be of future use in dealing with developing countries? I believe the answer is yes! The most obvious lesson learned is that in dealing with developing countries we must not

allow the perception of a parent-child relationship to emerge. Each nation-state has an equal amount of sovereignty and pride and this is not a function of wealth or size. We in the U.S. must learn to develop relations with other countries-especially developing ones-on a basis of common respect and mutual benefit. Anything short of this will cause the perception that prevailed during the early days of U.S.-Brazil relations, and no doubt friction in subsequent relations.

With a concerted effort to develop a foundation based on mutual trust and benefit the ground work is laid for a viable policy for arms sales and production. We should realize what developing countries seek from us is the technology and methods to improve their conditions. We must not be quick to judge the relative merits of a nations improvement desires but we should look at the long term payoffs that can result from our assistance. The linkage I am addressing is that between economic development and democracy. Recent history has shown-and Brazil is a classical case-that economic development to the extent of increasing the standard of living of a society can not develop without some form of free enterprise and entrepreneurship. And this step toward development will not be in the right direction unless people are motivated to succeed. People are motivated to succeed when human dignity and individual worth is brought to the forefront of a government's agenda-and these are the foundation of democracy. Therefore our assistance should be measured in its ability to support the linkage in the economic to democracy chain.

The U.S. should be willing to provide arms sales, production capability, and technology to those nations with which we share a common respect and mutual benefit. This is to say that arms sales and technology are not ends but means to a greater end and that is the development of society as a whole under the democracy model.

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